

## **Cobra Invitational January 24, 2015**

### **Can't Judge A Powder – Part 2**

#### **Instructions:**

You will have **20 minutes** for Part 2

You will use your observations from Part 1 to answer the questions in Part 2

You will be provided with a **different color pen** from Part 1

Using only this new pen, **answer** the questions on these pages by **writing the number(s) of the observation(s) from Part 1 that answer the questions in the associated Evidence Number block**. Some questions may have multiple observations that answer the question. If you know the answer to a question, but do not have that observation written in part 1, you may add it at the end of your observation list in the new pen color for partial credit.

**Remember, you MUST write the number of the observation in the Evidence Number block in order to answer each question.**

**Question 21 is first tie-breaker.**

**Second tie-breaker would be overall quality of the observations.**

**TOTAL POINTS: 105**

**SCORE: \_\_\_\_\_/105**

Team Name \_\_\_\_\_, Team number \_\_\_\_\_  
Student names: \_\_\_\_\_

<u>Questions</u>	<u>Evidence Number</u>	<u>Score</u> <u>(DO NOT MARK</u> <u>IN THIS AREA)</u>
<u>1. Describe the appearance of the substance.</u> <b>Blue, crystalline, no odor, clumpy, irregular crystals, bright</b>		<u>0 1 2 3 4 5</u>
<u>2. Was your powder amorphous or crystalline?</u> <b>Crystalline</b>		<u>0 1 2 3 4 5</u>
<u>3. Was the powder(substance) hygroscopic?</u> <b>Hygroscopic</b>		<u>0 1 2 3 4 5</u>
<u>4. What was the number on your unknown bag?</u> <b>Varies</b>		<u>0 1 2 3 4 5</u>
<u>5. Was the powder hydrophobic or hydrophilic?</u> <b>Hydrophilic</b>		<u>0 1 2 3 4 5</u>
<u>6. As the substance dissolved in water, was it endothermic or exothermic?</u> <b>Slightly exothermic, exact temperature change can vary</b>		<u>0 1 2 3 4 5</u>
<u>7. Was the density of the powder greater or lower than water?</u> <b>Density of powder was higher than water.</b>		<u>0 1 2 3 4 5</u>

<u>Questions</u>	<u>Evidence Number</u>	<u>Score</u> <u>(DO NOT MARK</u> <u>IN THIS AREA)</u>
<u>8. Was the aqueous solution of powder ionic or covalent?</u>  <b>Ionic</b>		<u>0 1 2 3 4 5</u>
<u>9. Was aqueous solution of powder a weak base.....a strong base.....</u> <u>Neutral.....a weak acid...X.....a strong base.....?</u>  <b>Weak acid, should support with observation</b>		<u>0 1 2 3 4 5</u>
<u>10. When added to 1M HCl, was there effervescence?</u>  <b>No</b>		<u>0 1 2 3 4 5</u>
<u>11. Is the powder/water mixture more or less ionic than Solution X?</u>  <b>More</b>		<u>0 1 2 3 4 5</u>
<u>12. Was the substance more soluble in water or acid?</u>  <b>Increased solubility in acid</b>		<u>0 1 2 3 4 5</u>
<u>13. Was there a reaction when powder was added to base?</u>  <b>Yes, precipitate and increase in temperature</b>		<u>0 1 2 3 4 5</u>
<u>14. Was a precipitate formed when the substance was added to base? If so, describe the precipitate?</u> <b>Yes, blue precipitate that was fluffy and settled at the bottom</b>		<u>0 1 2 3 4 5</u>
<u>15. Was a precipitate formed when the substance was added to acid? If so, describe the precipitate?</u> <b>No</b>		<u>0 1 2 3 4 5</u>

<u>Questions</u>	<u>Evidence Number</u>	<u>Score</u> <u>(DO NOT MARK</u> <u>IN THIS AREA)</u>
<u>16. The precipitate formed could be dissolved using HCL. List the observation where it dissolved?</u>  <b>Observation number can vary</b>		<u>0 1 2 3 4 5</u>
<u>17. What color was solution X?</u>  <b>Blue</b>		<u>0 1 2 3 4 5</u>
<u>18. Was there a reaction when aluminum foil was added to aqueous solution of the powder? Describe why there was no reaction.</u> <b>No reaction, because of protective oxide film.</b>		<u>0 1 2 3 4 5</u>
<u>19. What happened to Aluminum foil when added to solution X?</u> <b>Gas bubbles formed, foil turned black, exothermic reaction</b>		<u>0 1 2 3 4 5</u>
<u>20. Arrange the solutions provided from most acidic to most basic and record the observation number below each solution?</u> <u>Most acidic HCL..... X..... H2O..... NaOH.....Most basic</u>  <u>Observations.....Varies</u>		<u>0 1 2 3 4 5</u>  <u>0 1 2 3 4 5</u>
<u>21. What was the concentration of the acid provided?</u>  <b>1M</b>		<u>0 1 2 3 4 5</u>  <u>Tie Breaker</u>

For Judges only:

5 points – For correct well written observation(s)

4 points- For correct observation(s)

3 points- For correct well written partial observations

2 points- For late observation –correct answer with support ( 2 points for a missed observation but correct answer with correct late observation)

1 point - For correct answer without support ( 1 point for a missed observation but correct answer with no support)

0 point – incorrect observation and incorrect answer